Problem XI.

To determine $(\underset{\text{iii.iv}}{\mathfrak{A}}\underset{\text{ii.iii}}{\mathbb{B}}\underset{\text{i}}{\mathbb{C}}\mathbb{D})$ the present value of £1 payable on the failure of the joint lives A_1, A_2, A_3, . . . provided that event shall occur after the failure of the joint lives B_1, B_2, B_3 . . .; and provided the joint lives C_1, C_2, C_3, . . . shall fail before the joint lives B_1, B_2, B_3, . . . and before the joint lives D_1, D_2, D_3, . . .

Solution.

$$\urcorner_{\underset{\text{ii.iii}}{B}\,\underset{\text{i}}{C}D}A+\underset{\text{iii.iv}}{\mathfrak{A}}\underset{\text{ii.iii}}{\mathbb{B}}\underset{\text{i}}{\mathbb{C}}\mathbb{D}\left(1+\frac{1}{r}\right)=\underset{\substack{\text{ii.iii}\\ \text{d}\\ \text{ii}}}{\boldsymbol{\mathfrak{B}}}\mathbb{A}\underset{\text{i}}{\mathbb{C}}\mathbb{D}\left(1+\frac{1}{r}\right)$$

$$\therefore\ \underset{\text{iii.iv}}{\mathfrak{A}}\underset{\text{ii.iii}}{\mathbb{B}}\underset{\text{i}}{\mathbb{C}}\mathbb{D}=\underset{\substack{\text{ii.iii}\\ \text{d}\\ \text{ii}}}{\boldsymbol{\mathfrak{B}}}\mathbb{A}\underset{\text{i}}{\mathbb{C}}\mathbb{D}-\urcorner_{\underset{\text{ii.iii}}{B}\,\underset{\text{i}}{C}D}A(1-v)$$

$$=\underset{\substack{\text{ii.iii}\\ \text{d}\\ \text{ii}}}{\boldsymbol{\mathfrak{B}}}\mathbb{A}\underset{\text{i}}{\mathbb{C}}\mathbb{D}-(\urcorner_{\substack{CBD\\ \text{i}}}A-\urcorner_{\substack{CD\\ \text{i}}}AB)(1-v).$$

Problem XII.

To determine $(\underset{\text{iv}}{\mathfrak{A}}\underset{\text{iii}}{\mathbb{B}}\underset{\text{ii}}{\mathbb{C}}\underset{\text{i}}{\mathbb{D}})$ the present value of £1 payable on the joint lives A_1, A_2, A_3, . . . failing after the failure of the joint lives B_1, B_2, B_3, . . . provided that the joint lives C_1, C_2, C_3, . . . shall fail before the joint lives B_1, B_2, B_3, . . . and after the joint lives D_1, D_2, D_3, . . .

Solution.

$$\underset{\text{iv}}{\mathfrak{A}}\underset{\text{iii}}{\mathbb{B}}\underset{\text{ii}}{\mathbb{C}}\underset{\text{i}}{\mathbb{D}}+\underset{\text{iii.iv}}{\mathfrak{A}}\underset{\text{ii.iii}}{\mathbb{B}}\underset{\text{i}}{\mathbb{C}}\mathbb{D}=\underset{\text{iii}}{\mathfrak{A}}\underset{\text{ii}}{\mathbb{B}}\mathbb{C}=\mathfrak{A}-\underset{\text{i}}{\mathfrak{A}}\mathbb{B}-\underset{\text{i}}{\boldsymbol{\mathfrak{B}}}\mathbb{A}\mathbb{C}+\urcorner_{\substack{BC\\ \text{i}}}A(1-v)$$

$$\underset{\text{iv}}{\mathfrak{A}}\underset{\text{iii}}{\mathbb{B}}\underset{\text{ii}}{\mathbb{C}}\underset{\text{i}}{\mathbb{D}}=\mathfrak{A}-\underset{\text{i}}{\mathfrak{A}}\mathbb{B}-\underset{\text{i}}{\boldsymbol{\mathfrak{B}}}\mathbb{A}\mathbb{C}+\urcorner_{\substack{BC\\ \text{i}}}A(1-v)-\underset{\text{iii.iv}}{\mathfrak{A}}\underset{\text{ii.iii}}{\mathbb{B}}\underset{\text{i}}{\mathbb{C}}\mathbb{D}$$

$$=\mathfrak{A}-\underset{\text{i}}{\mathfrak{A}}\mathbb{B}-\underset{\text{i}}{\boldsymbol{\mathfrak{B}}}\mathbb{A}\mathbb{C}-\underset{\substack{\text{ii iii}\\ \text{d}\\ \text{ii}}}{\boldsymbol{\mathfrak{B}}}\mathbb{A}\underset{\text{i}}{\mathbb{C}}\mathbb{D}+(\urcorner_{\substack{BC\\ \text{i}}}A+\urcorner_{\substack{CBD\\ \text{i}}}A-\urcorner_{\substack{CD\\ \text{i}}}AB)(1-v).$$

On a Table for the Formation of Logarithms and Anti-Logarithms to Twelve Places. By Peter Gray, F.R.A.S., *Honorary Member of the Institute of Actuaries.*

[Read before the Institute, 27th December, 1864.]

With the exception of the publication, on a more limited scale (and which will be hereafter referred to), of that which is now to be developed, there exists at present no ready and practical method of forming to more than seven places the logarithms of numbers of more than seven or eight figures. The great extent of the tables requisite, if formed on the plan of our present seven-figure tables, is not only likely ever to prove a bar to their construction, but it

would also render them too cumbrous, if constructed, to be easily and readily used. In the present method, the end in view is sought to be attained in another way. The principle of the method is the resolution of the number whose logarithm is required, by a direct and easy process, into factors of a peculiar form, the logarithms of which, to the requisite extent, admit of easy tabulation. The logarithms of the factors, then, being taken from the table, their sum is the logarithm of the given number.

It may be said, that the foregoing is the principle employed in other methods that have been proposed for the same purpose. This is quite true. And I think I may venture to say that it is the principle that must of necessity be employed in every method that may hereafter be proposed. What constitutes the superiority claimed for the present over previous methods, is the peculiar form of the factors into which the number is resolved, and the resulting simplicity of the process by which the resolution is effected. I reserve what I have to say on the history of the method till the table has been described, and the manner of using it exemplified.

Description and use of the Table.

The table, which is adapted for the formation of logarithms and anti-logarithms of twelve places, consists of three columns, headed I., II., III., respectively. We require a Col. IV.; but it is unnecessary to insert it, as, if separately exhibited, it would consist of merely the first three figures (made true in the last place) of the corresponding values in Col. III. The argument, which occupies the small side column, headed n, extends from 000 to 999. The values in the several columns are related to the corresponding argument value as follows:—If n denote any value in the argument column, then we have corresponding,

in Col. I., $\log(1+\cdot 001n)$;
„ II., „ $(1+\cdot 001^2n)$;
„ III., „ $(1+\cdot 001^3n)$;
„ IV., „ $(1+\cdot 001^4n)$.

For example, corresponding to 576 we have,

in Col. I., log 1·576;
„ II., „ 1·000,576;
„ III., „ 1·000,000,576;
„ IV., „ 1·000,000,000,576.

The ciphers following the decimal point, and preceding the figures exhibited in Cols. II. and III., are omitted, so that the last figure in each tabular value occupies the twelfth decimal place.

The Auxiliary Table contains the logarithms and the co-logarithms (that is, the logarithms of the reciprocals) of the natural numbers 2 to 9.

Problem I.

To find the logarithm of any given number, to twelve places.

First. When the first figure of the given number is unity.

1. Insert the decimal point after the first figure, and make twelve decimal places, either by annexing ciphers or by cutting off figures that extend beyond the twelfth place, as the case may require. It is convenient also to separate the decimal into periods of three figures, either in the usual way, by points or commas, or, if paper ruled in squares be used, by deepening every third vertical line. The number thus modified I call the prepared number.

2. Cut off the leading figure and the first period of the prepared number for a divisor, and let the remaining portion of the number be the dividend. Divide now till three quotient figures have been obtained; observing that, as the first quotient figure must be got from the first four figures of the dividend, if the divisor will not go in those four figures, the first quotient figure will be a cipher. This division will use up the second and third periods of the prepared number.

3. Annex to the remainder of the previous division the remaining period of the prepared number, for a new dividend; and for a new divisor, annex to the first the second period of the prepared number (subject to an occasional small correction in its last figure, as will be presently explained). Set down the divisor thus formed in juxtaposition with its dividend, and continue the division, now necessarily in the contracted form, the first step being the pointing off of the last figure of the divisor. Six quotient figures will be obtained, which are to be arranged in triads.

4. The first period of the prepared number (that is, the decimal portion of the first divisor) and the three quotients thus form four triads, with which the four columns of the principal table are to be entered in order, and the results taken out. The sum of these will be the mantissa of the required logarithm, to which the characteristic, to be determined by reference to the given number, must be prefixed.

The correction above referred to, as occasionally due to the second divisor, arises as follows:—The true and complete second divisor, if no contraction were used, would be the number consisting of the leading unit and the first three periods of the prepared

number, diminished by the remainder of the first division; and it is this diminished number, when curtailed of its last period, and made true in the last place retained, which ought to form our second divisor. It is necessary, therefore, when the utmost attainable accuracy is desired, to attend to the effect of the diminution referred to on the portion of the divisor that we retain. It will soon be perceived that this effect must be in all cases very small. In point of fact, the remainder—the number by which the complete divisor has to be diminished—consisting generally of only three figures, and these occupying the same place in the decimal scale as the period which is cut off for the formation of our contracted divisor, will frequently have an appreciable effect on that period alone, so as to leave the last figure of the adjoining period unaltered, or even not to interfere with the increase which is due to it in consequence of the first figure of the period cut off being 5 or more. Never, in any case, is the correction greater than the diminution by a unit of the last figure of the second period. And when it is recollected that this last figure is cut off at the first step, and so contributes only the carriage from it to the subsequent operation, it is obvious that the correction, even in cases where it is found to be due, will only occasionally exercise any influence on the final result. It is nevertheless so easy to ascertain, in any particular case, whether or not the correction is due, that I do not feel justified in suggesting that it should be overlooked.

Secondly. When the first figure of the given number is other than unity.

1. Multiply or divide the given number by any number consisting of a single digit that will give a result having unity for its first figure; and proceed with this result, as regards the resolving process, as above directed. The number thus employed I call the preparing number.

2. Take from the Auxiliary Table, according as the preparing number was used as a divisor or a multiplier, its logarithm or its co-logarithm, and include it in the addition with the values taken from the principal table. The sum, with the proper characteristic prefixed, will, as before, be the logarithm required.

It is obvious that any number whatsoever may as above be brought within the compass of our table: division by its first digit will bring it into the required form. But we are by no means restricted to a single mode of preparation. Every number admits of no fewer than four or five, and two of them may be employed when verification is required.

I now give some examples :—

Ex. 1.—Required the logarithm of 134·514,347,22.

1·345)143 472 200	106
134 5	
8 972	
8 070	
1·345 14$\cancel{2}$)902 200	670
807 086	
95 114	
94 160	
954	709
942	
12	
128 722 284 338	345 Col. I.
46 032 775	106 „ II.
290 977	670 „ III.
308	709 „ IV.
2·128 768 608 398	=log. req.

13 451 434 722	÷9
1·494)603 858 000	404
597 6	
6 258	
5 976	
1·494 60$\cancel{4}$)282 000	188
149 460	
132 540	
119 568	
12 972	
11 957	
1 015	679
897	
118	
105	
13	
954 242 509 439	log 9
174 350 597 479	494 Col. I.
175 419 538	404 „ II.
81 647	188 „ III.
295	679 „ IV.
2·128 768 608 398	=log. req.

I give two solutions of this example, which verify each other. The operations are so simple, they admit of such lucid arrangement, and the steps are consequently so easily followed, that special description, after the full explanations that have been given, seems to be unnecessary. I have used division by 9 in the second solution; but division by 7 or 8, or multiplication by 8 or 9, would have answered equally well. One or more of these may be tried, as exercises.

In the first solution, the last figure of the second period of the prepared number is unchanged in the second divisor. The subtraction of the remainder, 902, from 3,472, gives 2,570; and cutting off the last period, the 2 becomes 3. In the second solution, the subtraction of 282 from 3,858 gives 3,576; and on cutting off the last period, the 3 becomes 4.

The results of the two foregoing operations agree in the last figure, but the agreement is fortuitous, for both are wrong. The last figure is truly 9. It is obvious that in such operations, where contracted division is used, and the logarithms employed are only approximately true, we must be prepared for some degree of uncertainty as to the last place. I am able to say, however, that, in the course of a pretty extensive use of these tables, I have to my knowledge met with only a single instance in which the error was so great as 2 in the last place. An error of 1, in either excess or defect, I admit, is far from rare; but I believe that, in a majority of cases, the logarithms formed are true to the nearest figure.*

Ex. 2.—Given $\pi = 3{\cdot}141{,}592{,}653{,}590$; required its logarithm.

3 141 592 653 590	$\div 3$	314 159 265 359 0 $\times 4$	
1·047)197 551 197	188	1·256)637 061 436	507
104 7		628 0	
92 85		9 061	
83 76		8 792	
9 091		1·256 63$\cancel{7}$)269 436	214
8 376		251 327	
1·047 19$\cancel{7}$)715 197	682	18 109	
628 318		12 566	
86 879		5 543	
83 776		5 027	
3 103		516	410
2 094		503	
1 009	964	13	
942			
67			
63			
4			

477 121 254 720	log 3	397 940 008 672	colog 4
19 946 681 679	047	98 989 639 401	256
81 639 689	188	220 131 504	507
296 189	682	92 939	214
419	964	178	410
0·497 149 872 696	$=\log \pi$	0·497 149 872 694	$=\log \pi$

* Certainly more than this cannot be said of the results of the common seven-figure tables, when interpolation is used.

Two solutions are given, using division by 3, and multiplication by 4. Division by 2 and multiplication by 6 would give two more. The results differ by 2 in the twelfth place, the first being wrong and the second right. In fact, this is the instance referred to above, as being the only one in which I recollect to have met with an error so great as 2. And it arises in this case I find, chiefly, from the circumstance that the whole of the five logarithms, whose sum gives log. π, have been increased in their last figure. The concurrence of so many as five logarithms similarly affected must necessarily be extremely rare.

Ex. 3.—Given ϵ (the Naperian base) $=2{\cdot}718{,}281{,}828{,}459$; required log ϵ.

2 718 281 828 459	$\div 2$
1·359)140 914 230	103
135 9	
5 014	
4 077	
1·359 14$\cancel{0}$)937 230	689
815 484	
121 746	
108 731	
13 015	
12 232	
783	576
680	
103	
95	
8	
301 029 995 664	log 2
133 219 456 732	359
44 730 028	103
299 229	689
250	576
0·434 294 481 903	=M

271 828 182 845 9	$\times 4$
1·087)312 731 384	287
217 4	
95 33	
86 96	
8 371	
7 609	
1·087 31$\cancel{2}$)762 384	701
761 118	
1 266	
1 087	
179	165
109	
70	
65	
5	
397 940 008 672	colog 4
36 229 544 086	087
124 624 634	287
304 440	701
72	165
0·434 294 481 904	=M

Two solutions are again given, and two more may be had by using 6 and 7 as multipliers. The result of the first is true in the

last figure; that of the second errs by a unit in the last place in excess. The logarithm formed is the modulus of the common system, and, as such, is usually denoted by M.

Ex. 4.—Required the logarithm of 54·3839.

543 839	×2	5 438 39	÷4
1·087)678 000 000	623	1·359)597 500 000	439
652 2		543 6	
25 80		53 90	
21 74		40 77	
4 060		13 130	
3 261		12 231	
1·087 677)799 000	734	1·359 597)899 000	661
761 374		815 758	
37 626		83 242	
32 630		81 576	
4 996		1 666	
4 351		1 360	
645	593	306	225
544		272	
101		34	
98		27	
3		7	
698 970 004 336	colog 2	602 059 991 328	log 4
36 229 544 086	087	133 219 456 732	359
270 481 216	623	190 613 441	439
318 772	734	287 069	661
258	593	98	225
1·735 470 348 668	log. req.	1·735 470 348 668	

I have selected this example because it is the one employed by Borda and his editor, Delambre, for the illustration of their methods. (See Borda's Tables, author's and editor's prefaces, pp. 16, 17, 77 to 81.) And I invite comparison of the above easy and direct processes, in which not a figure is suppressed, with those made use of by the distinguished mathematicians just named. Both the solutions here given are true in the last figure.

Ex. 5.—Required the logarithm of 67·383,036,620,64.

6 738 303 662 064	÷6
1·123)050 610 344	045
44 92	
5 690	
5 615	
1·123 05$\cancel{1}$)075 344	067
67 383	
7 961	
7 861	
100	089
90	
10	
778 151 250 384	log 6
50 379 756 261	123
19 542 812	045
29 098	067
39	089
1·828 550 578 594	log. req.

3 965 595 716 040	÷3
1·321)865 238 680	654
792 6	
72 63	
66 05	
6 588	
5 284	
1·321 86$\cancel{4}$)1 304 680	987
1 189 678	
115 002	
105 749	
9 253	
9 253	
477 121 254 720	log 3
120 902 817 615	321
283 935 754	654
428 648	987
2·598 308 436 737	log. req.

This example has been chosen to illustrate the case of the occurrence of ciphers in the first place of the several quotients.

Ex. 6.—Find the logarithm of 396·559,571,604.

This example affords an instance of what sometimes happens, namely, the encroachment by the remainder of the first division on the space occupied in previous examples by the second divisor. This occasions little inconvenience. The remedy is, to move the second divisor a little to the left.

We may notice here also, as confirmatory of a previous remark, that notwithstanding the comparative magnitude of the remainder in question, the effect of it in the formation of the second divisor is still no more than the abatement of a unit in its last figure.

There is another specialty in this example: the dividend is exhausted when the second triad of quotient figures has been obtained. There is, consequently, no entry in Col. IV.

Ex. 7.—Required the logarithm of 1·000,693,387,464.

1·000 69$\cancel{3}$)387 464	387
300 208	
87 256	
80 055	
7 201	
7 005	
196	196
000 300 861 839	693 Col. II.
168 072	387 „ III.
85	196 „ IV.
0·000 301 029 996	=log.req.

10 006 933 874 64	÷7
1·429)561 982 091	393
428 7	
133 28	
128 61	
4 672	
4 287	
1·429 56$\cancel{1}$)385 091	269
285 912	
99 179	
85 774	
13 405	
12 866	
539	377
429	
110	
100	
10	
845 098 040 014	log. 7
155 032 228 791	429
170 644 202	393
116 825	269
164	377
0·000 301 029 996	=log.req.

We might here proceed strictly according to the rule, cutting off the first period, 1·000, for the divisor. Obviously the effect would be, that the first quotient would be 693, and we should get for the second divisor the first two periods unaltered. We avoid needless work therefore by commencing with this divisor. In the second part of the process, still working by rule, we should take 000 as the argument for Col. I. But the result answering to this being 0, we simply pass over Col. I., and commence our entries with Col. II.

A second solution is given for verification, requiring many more figures than the first. Both are true in the last place. (See *Ex.* 14.)

When nine figures only are required in the logarithm, the process undergoes material simplification. The first divisor is used

throughout the resolving process, contraction, by its curtailment, commencing immediately after the formation of the first quotient; and there is no entry in Col. IV.

Ex. 8.—Required log π to nine places.

3 141 592 654	÷3
1·047)197 551	188
104 7	
92 85	
83 76	
9 091	
8 376	
715	683
628	
87	
84	
3	
477 121 255	log 3
19 946 682	047 Col. I.
81 640	188 „ II.
297	683 „ III.
0·497 149 874	=log π

314 159 265	4×4
1·256)637 062	507
628 0	
9 062	
8 792	
270	215
251	
19	
13	
6	
397 940 009	colog 4
98 989 639	256
220 132	507
93	215
0·497 149 873	=log π

Two solutions are given, the second being true in the last figure. (See *Ex.* 2.)

Ex. 9.—Required the logarithm of ·123,456,79 to nine places.

1·234)567 900	460
493 6	
74 30	
74 04	
260	211
247	
13	
12	
1	
091 315 160	234 Col. I.
199 730	460 „ II.
092	211 „ III.
$\bar{1}$·091 514 982	=log. req.

123 456 79	×9
1·111)111 110	100
111 1	
10	009
045 757 491	colog 9
45 714 059	111
43 427	100
4	009
$\bar{1}$·091 514 981	

Of the two solutions here given, differing by one in the last place, I do not know which is the more correct. It so happens that the second is simplified by the use of a preparing number.

If six places in the mantissa of the logarithm suffice, the process is still further simplified. Contraction of the divisor here commences previous to the formation of the first quotient, and there is no argument for either Col. III. or Col. IV.

Ex. 10.—Required log. π to six places.

3 141 593	÷3	314 159	3×4
1·04$\cancel{7}$)198	189	1·25$\cancel{0}$ 637	507
105		628	
93		9	
84			
9			
477 121	log 3	397 940	colog 4
19 947	047 Col. I.	98 990	256 Col. I.
82	189 ,, II.	220	507 ,, II.
0·497 150	=log π	0·497 150	=log π

Both the foregoing solutions are true in the last figure. This last process may occasionally be of use in the absence of a seven-figure table; but, of course, no one would think of employing it with such a table at hand.

In all the foregoing examples I have employed the ordinary form of division in the resolving process; but it is strongly recommended, in practice, to use the short form, that in which the remainders only of the several partial divisions are set down. This method, while it saves the writing of many figures, and imparts great compactness to the work, will also, after a little practice, be found to be really easier than the more usual and much more lengthy operation. In illustration I subjoin, worked as here directed, the portion of *Ex.* 2 to which this remark has reference:—

3 141 592 653 590	÷3
1·047)197 551 197	188
92 85	
9 091	
1·047 19$\cancel{7}$)715 197	682
86 879	
3 103	
1 009	964
67	
4	

Problem II.

To find the number corresponding to any given logarithm, to twelve or thirteen places.

First. When the mantissa of the given logarithm is less than log 2, $=\cdot 301,029,995,664$.

1. Neglecting the index, cut down, or make up by the annexation of ciphers, the given logarithm to twelve places.

2. Decompose the logarithm thus modified, by successive subtraction of values taken from the several columns of the principal table, in order. The values thus taken from the table are to be in each case the greatest contained in the column in use, which does not exceed the number from which it has to be subtracted; and the arguments corresponding to them are to be placed in the margin. The result will be, that the given logarithm will be exhausted by a single entry in each column.

3. Proceed as follows with the four triads of figures placed in the margin:—To the first triad prefix unity followed by the decimal point, and set down the number thus formed as a multiplicand. Opposite, leaving space between for three more periods of three figures each, place the second triad, drawing a vertical line for a separator to the left of it. Now multiply by the triad just set down, commencing with the left hand figure, observing that the last (the right hand) figure of the first partial product will fall in the seventh decimal place, and that each successive product will fall one place to the right of that which precedes it. Add together the multiplicand and the three partial products.

4. Point off the first six figures of this sum for the effective new multiplicand, and opposite place the third triad for a multiplier. Multiply as before, taking account of the carriage from the figures cut off, and curtailing the multiplicand by one figure at each step. The last figure of each product will now fall in the twelfth place. Opposite the last formed product place the fourth triad, and continue the multiplication till all the figures of this triad have been used. The sum of the multiplicand and the partial products, when pointed in accordance with the index of the given logarithm, will be the number required.

Secondly. When the mantissa of the given logarithm is not less than log 2.

1. Prepare the given logarithm by subtracting from it any value in the auxiliary table that will leave a remainder less than $\cdot 3010299$ . . . , and proceed with this remainder as above directed.

2. Multiply the sum which in the previous case formed the final result by the number corresponding to the logarithm, or divide it by the number corresponding to the co-logarithm, employed in the preparation, as the case may be; and the product, properly pointed, will be the number required.

It will now be found that here, in strict analogy with what obtains in the converse case of Problem I., every logarithm, whether it exceed or fall short of log 2 (indices being disregarded), admits of the use of four or five preparing logarithms. This is convenient, on account of the facility it affords for verification.

I now offer a few examples.

Ex. 11.—Find the anti-logarithm of 2·128,768,608,398. (See *Ex.* 1.)

128 768 608 398	345
128 722 284 338	
46 324 060	106
46 032 775	
291 285	670
290 977	
308	709
308	
1·345	106
134 5	
8 070	
1·345 14~~2~~ 570	670
807 086	
94 160	709
942	
12	
1·345 143 472 200	
134·514 347 220	=No. req.

128 768 608 398	log 9
954 242 509 439	
174 526 098 959	494
174 350 597 479	
175 501 480	404
175 419 538	
81 942	188
81 647	
295	679
295	
1·494	404
597 6	
5 976	
1·494 60~~3~~ 576	188
149 460	
119 568	
11 957	679
897	
105	
13	
1·494 603 858 000	×9
13 451 434 722 000	
134·514 347 220	=No. req.

The above, as indicated, is the converse of *Ex.* 1. Two solutions are given, and both are true in the last figure. By attention

to the precepts no difficulty will be found in following out the operations. In each, the first portion shows the decomposition of the given logarithm into a series of tabular logarithms, and the second exhibits the multiplication of the corresponding numbers.

It will be observed, that every logarithm and every partial product which appears in each of the operations here, appears also in the corresponding converse operation of *Ex.* 1. The reason of this is sufficiently obvious.

Ex. 12.—Given $\log \pi = 0{\cdot}497{,}149{,}872{,}694$; to find π.

497 149 872 694	log 3
477 121 254 720	
20 028 617 974	047
19 946 681 679	
81 936 295	188
81 639 689	
296 606	682
296 189	
417	960
417	
1·047	188
104 7	
83 76	
8 376	
1·047 19$\cancel{0}$ 836	682
628 318	
83 776	
2 094	960
942	
63	
1·047 197 551 193	$\times 3$
3·141 592 653 579	$=\pi$

497 149 872 694	colog 4
397 940 008 672	
99 209 864 022	256
98 989 639 401	
220 224 621	507
220 131 504	
93 117	214
92 939	
178	410
178	
1·256	507
628 0	
8 792	
1·256 63$\cancel{0}$ 792	214
251 327	
12 566	
5 027	410
503	
13	
1·256 637 061 436	$\div 4$
314 159 265 359 0	
3·141 592 653 590	$=\pi$

Two solutions are given, as usual. In the first, the same concurrence as in the converse operation, of five similarly affected logarithms, takes place; and the consequence is, an error of 11 in the twelfth and thirteenth places of the resulting number. If we restrict ourselves to twelve places, the error will be only 1 in the last place. The second solution is true in the thirteenth place. In general, in the results of Problem II. we shall have the twelfth

place true, and an approximation to the truth, more or less close, in the thirteenth.

Ex. 13.—Given M=·434,294,481,903; required the corresponding number.

434 294 481 903	log 2
301 029 995 664	
133 264 486 239	359
133 219 456 732	
45 029 507	103
44 730 028	
299 479	689
299 229	
250	576
250	
1·359	103
135 9	
4 077	
1·359 13$\cancel{9}$ 977	689
815 484	
108 731	
12 232	576
680	
95	
8	
1·359 140 914 230	×2
2·718 281 828 460	$=\epsilon$

434 294 481 903	colog 4
397 940 008 672	
36 354 473 231	087
36 229 544 086	
124 929 145	287
124 624 634	
304 511	701
304 440	
71	163
71	
1·087	287
217 4	
86 96	
7 609	
1·087 31$\cancel{1}$ 969	701
761 118	
1 087	163
109	
65	
3	
1·087 312 731 382	÷4
271 828 182 845	5
2·718 281 828 455	$=\epsilon$

The results of the two solutions here differ by 5 in the thirteenth place. The last two figures should be 59.

Ex. 14.—Required the one thousandth root of 2.

The number here required is the value of $2^{\cdot 001}$, the logarithm of which is

$$(\log 2)\times\cdot 001=0\cdot 000{,}301{,}029{,}996;$$

and the operation is as follows:—

000 301 029 996	693 Col. II.
300 861 839	
168 157	387 „ III.
168 072	
85	196 „ IV.
85	
1·000 69$\cancel{3}$	387
300 208	
80 056	
7 005	196
100	
90	
6	
1·000 693 387 465	$=2^{\cdot 001}$

000 301 029 996	log 9
954 242 509 439	
46 058 520 557	111
45 714 058 941	
344 461 616	793
344 259 043	
202 573	466
202 381	
192	442
192	
1·111	793
777 7	
99 99	
3 333	
1·111 88$\cancel{1}$ 023	466
444 752	
66 713	
6 671	442
445	
44	
2	
1 111 881 541 627	$\times 9$
10 006 933 874 643	
1·000 693 387 464	$=2^{\cdot 001}$

Here, as shown in the first solution, there is no need for an entry in the Auxiliary Table, nor in Col. I. of the principal table. In consequence, many figures are saved. In the second solution, added for verification, log 9 is used as a preparing logarithm. (See *Ex.* 7.)

Ex. 15.—It is required to evaluate 9^{9^9}, which is the greatest number that can be expressed by three figures in the Arabic notation.

The number here to be determined is, that power of 9 whose exponent is 9^9, or 387,420,489. Its logarithm consequently is

$$(\log 9) \times 387{,}420{,}489 = 369{,}693{,}099{\cdot}631{,}570{,}358{,}743;^*$$

and the operation is as follows:—

* It is hardly necessary to mention that to obtain this product true to the last figure, it is requisite to use log 9 to about twenty-three places. I take it to this extent from Callet.

631 570 358 743	log 4	631 570 358 743	colog 3
602 059 991 328		522 878 745 280	
29 510 367 415	070	108 691 613 463	284
29 383 777 685		108 565 023 733	
126 589 730	291	126 589 730	291
126 361 310		126 361 310	
228 420	525	228 420	525
228 005		228 005	
415	956	415	956
415		415	
1·070	291	1·284	291
214 0		256 8	
96 30		115 56	
1 070		1 284	
1·070 31$\cancel{1}$ 370	525	1·284 37$\cancel{3}$ 644	525
535 156		642 187	
21 406		25 687	
5 352	956	6 422	956
963		1 156	
54		64	
6		8	
1·070 311 932 937	×4	1·284 374 319 524	÷3
4 281 247 731 748	=No. req.	428 124 773 174 7	=No. req.

It thus appears that the required number is an integer consisting of 369,693,100 figures, the first thirteen of which are 428,124,773,174,8. If this number were written down in a line, allowing one-tenth of an inch to each figure, it would extend 583 miles 845 yards and 10 inches, or about as far as from London to Inverness; and to write it down, working day and night, at the rate of two figures per second, would occupy nearly six years.*

Ex. 16.—Given $\log \pi = 0·497,149,873$; required π to nine or ten places.

* The foregoing example was proposed by the late Mr. Frend, who succeeded, by considerations independent of the theory of logarithms, in assigning a portion of the required number.

497 149 873	log 3
477 121 255	
20 028 618	047
19 946 682	
81 936	188
81 640	
296	682
296	
1·047	188
104 7	
83 76	
8 376	682
628	
84	
2	
1 047 197 550	$\times 3$
3·141 592 650	$=\pi$

497 149 873	colog 4
397 940 009	
99 209 864	256
98 989 639	
220 225	507
220 132	
93	214
93	
1·256	507
628 0	
8 792	214
251	
13	
5	
1 256 637 061	$\div 4$
314 159 265	2
3·141 592 652	$=\pi$

In consequence of the restriction in the number of places required, the operations here are somewhat simplified. The logarithms are taken out to only nine places; and in the second part of the process the necessity for the formation of a new multiplicand does not arise.

Ex. 17.—Required π to six or seven places.

497 150	log 3
477 121	
20 029	047
19 947	
82	188
82	
1·04$\cancel{7}$	188
105	
84	
8	
1 047 197	$\times 3$
3·141 591	$=\pi$

497 150	colog 4
397 940	
99 210	256
98 990	
220	507
220	
1·25$\cancel{6}$	507
628	
9	
1 256 637	$\div 4$
314 159	2
3·141 592	$=\pi$

This example affords further illustration of the remarks made upon the one preceding.

Before leaving this problem I shall exhibit a somewhat modified form of the latter part of the operation. The form in question, as applied to the first solution of *Ex.* 12, is as follows:—

1·047	×3
3·141	188
314 1	
251 28	
25 128	
3·141 59$\cancel{0}$ 508	682
1 884 954	
251 327	
6 283	960
2 827	
188	
3·141 592 653 579	

The modification, it will be seen, consists in using up, at the beginning of the process instead of at the end, the number corresponding to the preparing logarithm. The writing of a few figures is saved. I do not know that in any other respect the modified process is either better or worse than the one previously employed.

In another paper I shall give demonstrations of the foregoing rules, and also an historical account of the method I have sought to develop.

Auxiliary Table.

	Logarithms.		Co-logarithms.
2	301 029 995 664	2	698 970 004 336
3	477 121 254 720	3	522 878 745 280
4	602 059 991 328	4	397 940 008 672
5	698 970 004 336	5	301 029 995 664
6	778 151 250 384	6	221 848 749 616
7	845 098 040 014	7	154 901 959 986
8	903 089 986 992	8	096 910 013 008
9	954 242 509 439	9	045 757 490 561

n.	I.	II.	III.		I.	II.	III.
000	000 000 000 000	000 000 000	000 000	050	021 189 299 070	021 714 181	021 715
1	000 434 077 479	000 434 294	000 434	1	021 602 716 028	022 148 454	022 149
2	000 867 721 531	000 868 588	000 869	2	022 015 739 818	022 582 726	022 583
3	001 300 933 020	001 302 881	001 303	3	022 428 371 185	023 016 998	023 018
4	001 733 712 809	001 737 174	001 737	4	022 840 610 877	023 451 269	023 452
5	002 166 061 757	002 171 467	002 171	5	023 252 459 634	023 885 540	023 886
6	002 597 980 720	002 605 759	002 606	6	023 663 918 198	024 319 810	024 320
7	003 029 470 554	003 040 051	003 040	7	024 074 987 307	024 754 080	024 755
8	003 460 532 110	003 474 342	003 474	8	024 485 667 699	025 188 349	025 189
9	003 891 166 237	003 908 633	003 909	9	024 895 960 107	025 622 619	025 623
010	004 321 373 783	004 342 923	004 343	060	025 305 865 265	026 056 887	026 058
1	004 751 155 591	004 777 213	004 777	1	025 715 383 901	026 491 155	026 492
2	005 180 512 504	005 211 503	005 212	2	026 124 516 745	026 925 423	026 926
3	005 609 445 360	005 645 792	005 646	3	026 533 264 523	027 359 691	027 361
4	006 037 954 997	006 080 080	006 080	4	026 941 627 959	027 793 957	027 795
5	006 466 042 249	006 514 368	006 514	5	027 349 607 775	028 228 224	028 229
6	006 893 707 948	006 948 656	006 949	6	027 757 204 691	028 662 490	028 663
7	007 320 952 923	007 382 943	007 383	7	028 164 419 424	029 096 756	029 098
8	007 747 778 001	007 817 230	007 817	8	028 571 252 693	029 531 021	029 532
9	008 174 184 006	008 251 517	008 252	9	028 977 705 209	029 965 285	029 966
020	008 600 171 762	008 685 803	008 686	070	029 383 777 685	030 399 550	030 401
1	009 025 742 087	009 120 088	009 120	1	029 789 470 832	030 833 814	030 835
2	009 450 895 799	009 554 374	009 554	2	030 194 785 357	031 268 077	031 269
3	009 875 633 712	009 988 658	009 989	3	030 599 721 966	031 702 340	031 703
4	010 299 956 640	010 422 942	010 423	4	031 004 281 364	032 136 603	032 138
5	010 723 865 392	010 857 226	010 857	5	031 408 464 252	032 570 865	032 572
6	011 147 360 776	011 291 510	011 292	6	031 812 271 330	033 005 126	033 006
7	011 570 443 597	011 725 793	011 726	7	032 215 703 298	033 439 388	033 441
8	011 993 114 659	012 160 075	012 160	8	032 618 760 851	033 873 649	033 875
9	012 415 374 762	012 594 357	012 595	9	033 021 444 683	034 307 909	034 309
030	012 837 224 705	013 028 639	013 029	080	033 423 755 487	034 742 169	034 744
1	013 258 665 284	013 462 920	013 463	1	033 825 693 953	035 176 428	035 178
2	013 679 697 291	013 897 201	013 897	2	034 227 260 771	035 610 687	035 612
3	014 100 321 520	014 331 481	014 332	3	034 628 456 625	036 044 946	036 046
4	014 520 538 758	014 765 761	014 766	4	035 029 282 202	036 479 204	036 481
5	014 940 349 793	015 200 041	015 200	5	035 429 738 185	036 913 462	036 915
6	015 359 755 409	015 634 320	015 635	6	035 829 825 253	037 347 720	037 349
7	015 778 756 389	016 068 599	016 069	7	036 229 544 086	037 781 976	037 784
8	016 197 353 512	016 502 877	016 503	8	036 628 895 362	038 216 233	038 218
9	016 615 547 557	016 937 155	016 937	9	037 027 879 756	038 650 489	038 652
040	017 033 339 299	017 371 432	017 372	090	037 426 497 941	039 084 745	039 087
1	017 450 729 511	017 805 709	017 806	1	037 824 750 588	039 519 000	039 521
2	017 867 718 964	018 239 985	018 240	2	038 222 638 369	039 953 255	039 955
3	018 284 308 427	018 674 261	018 675	3	038 620 161 950	040 387 509	040 389
4	018 700 498 666	019 108 537	019 109	4	039 017 321 997	040 821 763	040 824
5	019 116 290 447	019 542 812	019 543	5	039 414 119 176	041 256 016	041 258
6	019 531 684 531	019 977 087	019 978	6	039 810 554 148	041 690 269	041 692
7	019 946 681 679	020 411 361	020 412	7	040 206 627 575	042 124 522	042 127
8	020 361 282 648	020 845 635	020 846	8	040 602 340 114	042 558 774	042 561
9	020 775 488 194	021 279 908	021 280	9	040 997 692 423	042 993 026	042 995

n.	I.	II.	III.		I.	II.	III.
100	041 392 685 158	043 427 277	043 429	150	060 697 840 354	065 139 287	065 144
1	041 787 318 972	043 861 528	043 864	1	061 075 323 630	065 573 516	065 578
2	042 181 594 516	044 295 778	044 298	2	061 452 479 087	066 007 745	066 013
3	042 575 512 440	044 730 028	044 732	3	061 829 307 295	066 441 973	066 447
4	042 969 073 393	045 164 278	045 167	4	062 205 808 820	066 876 201	066 881
5	043 362 278 021	045 598 527	045 601	5	062 581 984 228	067 310 428	067 316
6	043 755 126 969	046 032 775	046 035	6	062 957 834 085	067 744 655	067 750
7	044 147 620 879	046 467 024	046 470	7	063 333 358 952	068 178 882	068 184
8	044 539 760 392	046 901 271	046 904	8	063 708 559 391	068 613 108	068 619
9	044 931 546 149	047 335 519	047 338	9	064 083 435 964	069 047 334	069 053
110	045 322 978 787	047 769 766	047 772	160	064 457 989 227	069 481 559	069 487
1	045 714 058 941	048 204 012	048 207	1	064 832 219 739	069 915 784	069 921
2	046 104 787 246	048 638 258	048 641	2	065 206 128 054	070 350 008	070 356
3	046 495 164 335	049 072 504	049 075	3	065 579 714 728	070 784 232	070 790
4	046 885 190 838	049 506 749	049 510	4	065 952 980 314	071 218 455	071 224
5	047 274 867 384	049 940 994	049 944	5	066 325 925 362	071 652 678	071 659
6	047 664 194 602	050 375 238	050 378	6	066 698 550 423	072 086 901	072 093
7	048 053 173 116	050 809 482	050 812	7	067 070 856 045	072 521 123	072 527
8	048 441 803 550	051 243 726	051 247	8	067 442 842 776	072 955 345	072 961
9	048 830 086 528	051 677 969	051 681	9	067 814 511 162	073 389 566	073 396
120	049 218 022 670	052 112 211	052 115	170	068 185 861 746	073 823 787	073 830
1	049 605 612 595	052 546 453	052 550	1	068 556 895 072	074 258 008	074 264
2	049 992 856 920	052 980 695	052 984	2	068 927 611 682	074 692 228	074 699
3	050 379 756 261	053 414 936	053 418	3	069 298 012 116	075 126 447	075 133
4	050 766 311 233	053 849 177	053 853	4	069 668 096 912	075 560 666	075 567
5	051 152 522 447	054 283 418	054 287	5	070 037 866 608	075 994 885	076 002
6	051 538 390 515	054 717 658	054 721	6	070 407 321 740	076 429 103	076 436
7	051 923 916 046	055 151 897	055 155	7	070 776 462 843	076 863 321	076 870
8	052 309 099 647	055 586 136	055 590	8	071 145 290 451	077 297 539	077 304
9	052 693 941 925	056 020 375	056 024	9	071 513 805 095	077 731 755	077 739
130	053 078 443 483	056 454 613	056 458	180	071 882 007 306	078 165 972	078 173
1	053 462 604 925	056 888 851	056 893	1	072 249 897 614	078 600 188	078 607
2	053 846 426 852	057 323 088	057 327	2	072 617 476 545	079 034 404	079 042
3	054 229 909 863	057 757 325	057 761	3	072 984 744 628	079 468 619	079 476
4	054 613 054 557	058 191 562	058 195	4	073 351 702 387	079 902 834	079 910
5	054 995 861 529	058 625 798	058 630	5	073 718 350 346	080 337 048	080 344
6	055 378 331 375	059 060 034	059 064	6	074 084 689 028	080 771 262	080 779
7	055 760 464 688	059 494 269	059 498	7	074 450 718 955	081 205 476	081 213
8	056 142 262 059	059 928 504	059 933	8	074 816 440 645	081 639 689	081 647
9	056 523 724 079	060 362 738	060 367	9	075 181 854 619	082 073 901	082 082
140	056 904 851 336	060 796 972	060 801	190	075 546 961 393	082 508 114	082 516
1	057 285 644 418	061 231 205	061 236	1	075 911 761 483	082 942 325	082 950
2	057 666 103 910	061 665 438	061 670	2	076 276 255 404	083 376 537	083 385
3	058 046 230 395	062 099 671	062 104	3	076 640 443 670	083 810 748	083 819
4	058 426 024 457	062 533 903	062 538	4	077 004 326 793	084 244 958	084 253
5	058 805 486 676	062 968 135	062 973	5	077 367 905 284	084 679 168	084 687
6	059 184 617 631	063 402 366	063 407	6	077 731 179 652	085 113 378	085 122
7	059 563 417 901	063 836 597	063 841	7	078 094 150 406	085 547 587	085 556
8	059 941 888 062	064 270 827	064 276	8	078 456 818 053	085 981 795	085 990
9	060 320 028 688	064 705 057	064 710	9	078 819 183 099	086 416 004	086 425

n.	I.	II.	III.		I.	II.	III.
200	079 181 246 048	086 850 212	086 859	250	096 910 013 008	108 560 051	108 574
1	079 543 007 403	087 284 419	087 293	1	097 257 309 693	108 994 237	109 008
2	079 904 467 667	087 718 626	087 727	2	097 604 328 874	109 428 422	109 442
3	080 265 627 340	088 152 833	088 162	3	097 951 070 994	109 862 607	109 876
4	080 626 486 922	088 587 039	088 596	4	098 297 536 495	110 296 791	110 311
5	080 987 046 911	089 021 244	089 030	5	098 643 725 817	110 730 975	110 745
6	081 347 307 804	089 455 450	089 465	6	098 989 639 401	111 165 159	111 179
7	081 707 270 097	089 889 654	089 899	7	099 335 277 686	111 599 342	111 614
8	082 066 934 285	090 323 859	090 333	8	099 680 641 109	112 033 525	112 048
9	082 426 300 861	090 758 063	090 768	9	100 025 730 108	112 467 707	112 482
210	082 785 370 316	091 192 266	091 202	260	100 370 545 118	112 901 889	112 917
1	083 144 143 143	091 626 469	091 636	1	100 715 086 573	113 336 070	113 351
2	083 502 619 830	092 060 672	092 070	2	101 059 354 908	113 770 251	113 785
3	083 860 800 867	092 494 874	092 505	3	101 403 350 555	114 204 432	114 219
4	084 218 686 739	092 929 076	092 939	4	101 747 073 946	114 638 612	114 654
5	084 576 277 934	093 363 277	093 373	5	102 090 525 512	115 072 791	115 088
6	084 933 574 937	093 797 478	093 808	6	102 433 705 681	115 506 970	115 522
7	085 290 578 230	094 231 679	094 242	7	102 776 614 883	115 941 149	115 957
8	085 647 288 297	094 665 879	094 676	8	103 119 253 546	116 375 328	116 391
9	086 003 705 618	095 100 078	095 110	9	103 461 622 095	116 809 505	116 825
220	086 359 830 675	095 534 278	095 545	270	103 803 720 956	117 243 683	117 259
1	086 715 663 945	095 968 476	095 979	1	104 145 550 554	117 677 860	117 694
2	087 071 205 907	096 402 675	096 413	2	104 487 111 312	118 112 037	118 128
3	087 426 457 036	096 836 873	096 848	3	104 828 403 654	118 546 213	118 562
4	087 781 417 810	097 271 070	097 282	4	105 169 427 999	118 980 388	118 997
5	088 136 088 701	097 705 267	097 716	5	105 510 184 770	119 414 564	119 431
6	088 490 470 182	098 139 464	098 151	6	105 850 674 385	119 848 739	119 865
7	088 844 562 727	098 573 660	098 585	7	106 190 897 263	120 282 913	120 300
8	089 198 366 805	099 007 855	099 019	8	106 530 853 822	120 717 087	120 734
9	089 551 882 886	099 442 051	099 453	9	106 870 544 479	121 151 261	121 168
230	089 905 111 439	099 876 246	099 888	280	107 209 969 648	121 585 434	121 602
1	090 258 052 931	100 310 440	100 322	1	107 549 129 745	122 019 606	122 037
2	090 610 707 828	100 744 634	100 756	2	107 888 025 183	122 453 779	122 471
3	090 963 076 596	101 178 827	101 191	3	108 226 656 375	122 887 951	122 905
4	091 315 159 697	101 613 021	101 625	4	108 565 023 733	123 322 122	123 340
5	091 666 957 596	102 047 213	102 059	5	108 903 127 667	123 756 293	123 774
6	092 018 470 753	102 481 405	102 493	6	109 240 968 588	124 190 463	124 208
7	092 369 699 629	102 915 597	102 928	7	109 578 546 904	124 624 634	124 642
8	092 720 644 684	103 349 789	103 362	8	109 915 863 024	125 058 803	125 077
9	093 071 306 376	103 783 979	103 796	9	110 252 917 353	125 492 972	125 511
240	093 421 685 162	104 218 170	104 231	290	110 589 710 299	125 927 141	125 945
1	093 771 781 499	104 652 360	104 665	1	110 926 242 266	126 361 310	126 380
2	094 121 595 841	105 086 550	105 099	2	111 262 513 659	126 795 477	126 814
3	094 471 128 642	105 520 739	105 534	3	111 598 524 880	127 229 645	127 248
4	094 820 380 355	105 954 928	105 968	4	111 934 276 333	127 663 812	127 683
5	095 169 351 432	106 389 116	106 402	5	112 269 768 417	128 097 979	128 117
6	095 518 042 323	106 823 304	106 836	6	112 605 001 535	128 532 145	128 551
7	095 866 453 479	107 257 491	107 271	7	112 939 976 084	128 966 311	128 985
8	096 214 585 346	107 691 678	107 705	8	113 274 692 464	129 400 476	129 420
9	096 562 438 374	108 125 865	108 139	9	113 609 151 073	129 834 641	129 854

n.	I.	II.	III.		I.	II.	III.
300	113 943 352 307	130 268 805	130 288	350	130 333 768 495	151 976 474	152 003
1	114 277 296 562	130 702 969	130 723	1	130 655 349 022	152 410 617	152 437
2	114 610 984 232	131 137 133	131 157	2	130 976 691 606	152 844 759	152 872
3	114 944 415 713	131 571 296	131 591	3	131 297 796 598	153 278 900	153 306
4	115 277 591 396	132 005 459	132 026	4	131 618 664 349	153 713 041	153 740
5	115 610 511 674	132 439 621	132 460	5	131 939 295 210	154 147 182	154 175
6	115 943 176 939	132 873 783	132 894	6	132 259 689 531	154 581 322	154 609
7	116 275 587 581	133 307 944	133 328	7	132 579 847 660	155 015 461	155 043
8	116 607 743 988	133 742 105	133 763	8	132 899 769 944	155 449 601	155 477
9	116 939 646 551	134 176 266	134 197	9	133 219 456 732	155 883 740	155 912
310	117 271 295 656	134 610 426	134 631	360	133 538 908 370	156 317 878	156 346
1	117 602 691 690	135 044 586	135 066	1	133 858 125 203	156 752 016	156 780
2	117 933 835 040	135 478 745	135 500	2	134 177 107 577	157 186 153	157 215
3	118 264 726 089	135 912 904	135 934	3	134 495 855 835	157 620 291	157 649
4	118 595 365 224	136 347 062	136 368	4	134 814 370 320	158 054 427	158 083
5	118 925 752 826	136 781 220	136 803	5	135 132 651 377	158 488 563	158 517
6	119 255 889 278	137 215 377	137 237	6	135 450 699 346	158 922 699	158 952
7	119 585 774 962	137 649 534	137 671	7	135 768 514 568	159 356 835	159 386
8	119 915 410 258	138 083 691	138 106	8	136 086 097 384	159 790 970	159 820
9	120 244 795 546	138 517 847	138 540	9	136 403 448 134	160 225 104	160 255
320	120 573 931 206	138 952 003	138 974	370	136 720 567 156	160 659 238	160 689
1	120 902 817 615	139 386 158	139 409	1	137 037 454 790	161 093 372	161 123
2	121 231 455 150	139 820 313	139 843	2	137 354 111 371	161 527 505	161 558
3	121 559 844 188	140 254 468	140 277	3	137 670 537 237	161 961 638	161 992
4	121 887 985 104	140 688 622	140 711	4	137 986 732 724	162 395 770	162 426
5	122 215 878 273	141 122 775	141 146	5	138 302 698 166	162 829 902	162 860
6	122 543 524 069	141 556 929	141 580	6	138 618 433 899	163 264 033	163 295
7	122 870 922 864	141 991 081	142 014	7	138 933 940 257	163 698 165	163 729
8	123 198 075 032	142 425 234	142 449	8	139 249 217 572	164 132 295	164 163
9	123 524 980 943	142 859 385	142 883	9	139 564 266 176	164 566 425	164 598
330	123 851 640 967	143 293 537	143 317	380	139 879 086 401	165 000 555	165 032
1	124 178 055 475	143 727 688	143 751	1	140 193 678 579	165 434 684	165 466
2	124 504 224 834	144 161 838	144 186	2	140 508 043 038	165 868 813	165 900
3	124 830 149 414	144 595 989	144 620	3	140 822 180 109	166 302 942	166 335
4	125 155 829 581	145 030 138	145 054	4	141 136 090 121	166 737 070	166 769
5	125 481 265 701	145 464 288	145 489	5	141 449 773 400	167 171 197	167 203
6	125 806 458 140	145 898 436	145 923	6	141 763 230 276	167 605 324	167 638
7	126 131 407 262	146 332 585	146 357	7	142 076 461 073	168 039 451	168 072
8	126 456 113 432	146 766 733	146 792	8	142 389 466 119	168 473 577	168 506
9	126 780 577 012	147 200 880	147 226	9	142 702 245 738	168 907 703	168 941
340	127 104 798 365	147 635 027	147 660	390	143 014 800 254	169 341 828	169 375
1	127 428 777 852	148 069 174	148 094	1	143 327 129 992	169 775 953	169 809
2	127 752 515 833	148 503 320	148 529	2	143 639 235 275	170 210 078	170 243
3	128 076 012 669	148 937 466	148 963	3	143 951 116 424	170 644 202	170 678
4	128 399 268 718	149 371 611	149 397	4	144 262 773 762	171 078 326	171 112
5	128 722 284 338	149 805 756	149 832	5	144 574 207 610	171 512 449	171 546
6	129 045 059 888	150 239 901	150 266	6	144 885 418 287	171 946 572	171 981
7	129 367 595 723	150 674 045	150 700	7	145 196 406 114	172 380 694	172 415
8	129 689 892 199	151 108 188	151 134	8	145 507 171 410	172 814 816	172 849
9	130 011 949 672	151 542 332	151 569	9	145 817 714 492	173 248 937	173 283

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400	146 128 035 678	173 683 058	173 718	450	161 368 002 235	195 388 558	195 432
1	146 438 135 286	174 117 179	174 152	1	161 667 412 438	195 822 657	195 867
2	146 748 013 631	174 551 299	174 586	2	161 966 616 364	196 256 755	196 301
3	147 057 671 028	174 985 419	175 021	3	162 265 614 298	196 690 853	196 735
4	147 367 107 794	175 419 538	175 455	4	162 564 406 523	197 124 951	197 170
5	147 676 324 241	175 853 657	175 889	5	162 862 993 322	197 559 048	197 604
6	147 985 320 684	176 287 776	176 324	6	163 161 374 977	197 993 145	198 038
7	148 294 097 435	176 721 894	176 758	7	163 459 551 770	198 427 241	198 473
8	148 602 654 806	177 156 011	177 192	8	163 757 523 982	198 861 337	198 907
9	148 910 993 109	177 590 128	177 626	9	164 055 291 893	199 295 432	199 341
410	149 219 112 655	178 024 245	178 061	460	164 352 855 784	199 729 527	199 775
1	149 527 013 754	178 458 361	178 495	1	164 650 215 934	200 163 622	200 210
2	149 834 696 716	178 892 477	178 929	2	164 947 372 622	200 597 716	200 644
3	150 142 161 849	179 326 593	179 364	3	165 244 326 125	201 031 810	201 078
4	150 449 409 461	179 760 708	179 798	4	165 541 076 722	201 465 903	201 513
5	150 756 439 860	180 194 822	180 232	5	165 837 624 690	201 899 996	201 947
6	151 063 253 354	180 628 936	180 666	6	166 133 970 305	202 334 088	202 381
7	151 369 850 247	181 063 050	181 101	7	166 430 113 843	202 768 180	202 815
8	151 676 230 847	181 497 163	181 535	8	166 726 055 580	203 202 272	203 250
9	151 982 395 457	181 931 276	181 969	9	167 021 795 790	203 636 363	203 684
420	152 288 344 383	182 365 388	182 404	470	167 317 334 748	204 070 454	204 118
1	152 594 077 927	182 799 500	182 838	1	167 612 672 728	204 504 544	204 553
2	152 899 596 394	183 233 612	183 272	2	167 907 810 001	204 938 634	204 987
3	153 204 900 084	183 667 723	183 707	3	168 202 746 843	205 372 723	205 421
4	153 509 989 301	184 101 833	184 141	4	168 497 483 523	205 806 812	205 856
5	153 814 864 345	184 535 944	184 575	5	168 792 020 314	206 240 901	206 290
6	154 119 525 516	184 970 053	185 009	6	169 086 357 487	206 674 989	206 724
7	154 423 973 115	185 404 163	185 444	7	169 380 495 312	207 109 076	207 158
8	154 728 207 440	185 838 272	185 878	8	169 674 434 059	207 543 163	207 593
9	155 032 228 791	186 272 380	186 312	9	169 968 173 997	207 977 250	208 027
430	155 336 037 465	186 706 488	186 747	480	170 261 715 395	208 411 337	208 461
1	155 639 633 760	187 140 596	187 181	1	170 555 058 521	208 845 422	208 896
2	155 943 017 972	187 574 703	187 615	2	170 848 203 643	209 279 508	209 330
3	156 246 190 397	188 008 810	188 049	3	171 141 151 028	209 713 593	209 764
4	156 549 151 332	188 442 916	188 484	4	171 433 900 943	210 147 678	210 198
5	156 851 901 070	188 877 022	188 918	5	171 726 453 653	210 581 762	210 633
6	157 154 439 906	189 311 127	189 352	6	172 018 809 425	211 015 846	211 067
7	157 456 768 134	189 745 232	189 787	7	172 310 968 522	211 449 929	211 501
8	157 758 886 047	190 179 337	190 221	8	172 602 931 210	211 884 012	211 936
9	158 060 793 937	190 613 441	190 655	9	172 894 697 752	212 318 094	212 370
440	158 362 492 095	191 047 545	191 090	490	173 186 268 412	212 752 176	212 804
1	158 663 980 814	191 481 648	191 524	1	173 477 643 453	213 186 258	213 239
2	158 965 260 383	191 915 751	191 958	2	173 768 823 137	213 620 339	213 673
3	159 266 331 093	192 349 853	192 392	3	174 059 807 725	214 054 419	214 107
4	159 567 193 234	192 783 955	192 827	4	174 350 597 479	214 488 500	214 541
5	159 867 847 093	193 218 057	193 261	5	174 641 192 660	214 922 580	214 976
6	160 168 292 959	193 652 158	193 695	6	174 931 593 528	215 356 659	215 410
7	160 468 531 119	194 086 258	194 130	7	175 221 800 343	215 790 738	215 844
8	160 768 561 861	194 520 359	194 564	8	175 511 813 363	216 224 816	216 279
9	161 068 385 471	194 954 458	194 998	9	175 801 632 848	216 658 895	216 713

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500	176 091 259 056	217 092 972	217 147	550	190 331 698 170	238 796 302	238 862
1	176 380 692 243	217 527 049	217 581	1	190 611 797 814	239 230 358	239 296
2	176 669 932 668	217 961 126	218 016	2	190 891 716 922	239 664 413	239 730
3	176 958 980 587	218 395 203	218 450	3	191 171 455 729	240 098 467	240 165
4	177 247 836 256	218 829 279	218 884	4	191 451 014 465	240 532 522	240 599
5	177 536 499 930	219 263 354	219·319	5	191 730 393 363	240 966 575	241 033
6	177 824 971 865	219 697 429	219 753	6	192 009 592 654	241 400 629	241 468
7	178 113 252 315	220 131 504	220 187	7	192 288 612 568	241 834 682	241 902
8	178 401 341 534	220 565 578	220 622	8	192 567 453 337	242 268 734	242 336
9	178 689 239 776	220 999 652	221 056	9	192 846 115 189	242 702 786	242 771
510	178 976 947 293	221 433 725	221 490	560	193 124 598 354	243 136 838	243 205
1	179 264 464 339	221 867 798	221 924	1	193 402 903 062	243 570 889	243 639
2	179 551 791 165	222 301 870	222 359	2	193 681 029 541	244 004 940	244 073
3	179 838 928 023	222 735 942	222 793	3	193 958 978 019	244 438 990	244 508
4	180 125 875 164	223 170 014	223 227	4	194 236 748 724	244 873 040	244 942
5	180 412 632 838	223 604 085	223 662	5	194 514 341 882	245 307 090	245 376
6	180 699 201 296	224 038 156	224 096	6	194 791 757 722	245 741 139	245 811
7	180 985 580 787	224 472 226	224 530	7	195 068 996 469	246 175 187	246 245
8	181 271 771 559	224 906 296	224 964	8	195 346 058 348	246 609 235	246 679
9	181 557 773 863	225 340 365	225 399	9	195 622 943 587	247 043 283	247 113
520	181 843 587 945	225 774 434	225 833	570	195 899 652 409	247 477 330	247 548
1	182 129 214 053	226 208 503	226 267	1	196 176 185 040	247 911 377	247 982
2	182 414 652 435	226 642 571	226 702	2	196 452 541 703	248 345 424	248 416
3	.182 699 903 336	227 076 639	227 136	3	196 728 722 623	248 779 470	248 851
4	182 984 967 004	227 510 706	227 570	4	197 004 728 023	249 213 515	249 285
5	183 269 843 683	227 944 773	228 005	5	197 280 558 126	249 647 560	249 719
6	183 554 533 619	228 378 839	228 439	6	197 556 213 154	250 081 605	250 154
7	183 839 037 056	228 812 905	228 873	7	197 831 693 329	250 515 649	250 588
8	184 123 354 240	229 246 971	229 307	8	198 106 998 873	250 949 693	251 022
9	184 407 485 412	229 681 036	229 742	9	198 382 130 008	251 383 736	251 456
530	184 691 430 818	230 115 100	230 176	580	198 657 086 954	251 817 779	251 891
1	184 975 190 698	230 549 165	230 610	1	198 931 869 932	252 251 822	252 325
2	185 258 765 297	230 983 228	231 045	2	199 206 479 162	252 685 864	252 759
3	185 542 154 854	231 417 292	231 479	3	199 480 914 862	253 119 906	253 194
4	185 825 359 613	231 851 355	231 913	4	199 755 177 253	253 553 947	253 628
5	186 108 379 813	232 285 417	232 347	5	200 029 266 554	253 987 988	254 062
6	186 391 215 695	232 719 479	232 782	6	200 303 182 982	254 422 028	254 496
7	186 673 867 500	233 153 541	233 216	7	200 576 926 755	254 856 068	254 931
8	186 956 335 465	233 587 602	233 650	8	200 850 498 091	255 290 107	255 365
9	187 238 619 831	234 021 663	234 085	9	201 123 897 207	255 724 146	255 799
540	187 520 720 836	234 455 723	234 519	590	201 397 124 320	256 158 185	256 234
1	187 802 638 718	234 889 783	234 953	1	201 670 179 647	256 592 223	256 668
2	188 084 373 715	235 323 842	235 388	2	201 943 063 402	257 026 261	257 102
3	188 365 926 063	235 757 901	235 822	3	202 215 775 801	257 460 298	257 537
4	188 647 296 000	236 191 960	236 256	4	202 488 317 060	257 894 335	257 971
5	188 928 483 761	236 626 018	236 690	5	202 760 687 393	258 328 372	258 405
6	189 209 489 582	237 060 076	237 125	6	203 032 887 015	258 762 408	258 839
7	189 490 313 699	237 494 133	237 559	7	203 304 916 138	259 196 443	259 274
8	189 770 956 347	237 928 190	237 993	8	203 576 774 978	259 630 478	259 708
9	190 051 417 759	238 362 246	238 428	9	203 848 463 746	260 064 513	260 142

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600	204 119 982 656	260 498 547	260 577	650	217 483 944 214	282 199 708	282 291
1	204 391 331 919	260 932 581	261 011	1	217 747 073 263	282 633 720	282 726
2	204 662 511 748	261 366 615	261 445	2	218 010 042 984	283 067 732	283 160
3	204 933 522 354	261 800 648	261 879	3	218 272 853 571	283 501 743	283 594
4	205 204 363 948	262 234 680	262 314	4	218 535 505 217	283 935 754	284 028
5	205 475 036 741	262 668 712	262 748	5	218 797 998 112	284 369 765	284 463
6	205 745 540 943	263 102 744	263 182	6	219 060 332 449	284 803 775	284 897
7	206 015 876 763	263 536 775	263 617	7	219 322 508 419	285 237 784	285 331
8	206 286 044 412	263 970 806	264 051	8	219 584 526 214	285 671 793	285 766
9	206 556 044 099	264 404 836	264 485	9	219 846 386 024	286 105 802	286 200
610	206 825 876 032	264 838 866	264 920	660	220 108 088 040	286 539 810	286 634
1	207 095 540 419	265 272 896	265 354	1	220 369 632 451	286 973 818	287 069
2	207 365 037 469	265 706 925	265 788	2	220 631 019 448	287 407 826	287 503
3	207 634 367 389	266 140 954	266 222	3	220 892 249 220	287 841 832	287 937
4	207 903 530 386	266 574 982	266 657	4	221 153 321 955	288 275 839	288 371
5	208 172 526 667	267 009 010	267 091	5	221 414 237 842	288 709 845	288 806
6	208 441 356 439	267 443 037	267 525	6	221 674 997 071	289 143 851	289 240
7	208 710 019 906	267 877 064	267 960	7	221 935 599 828	289 577 856	289 674
8	208 978 517 276	268 311 090	268 394	8	222 196 046 302	290 011 861	290 109
9	209 246 848 753	268 745 116	268 828	9	222 456 336 679	290 445 865	290 543
620	209 515 014 543	269 179 142	269 262	670	222 716 471 148	290 879 869	290 977
1	209 783 014 849	269 613 167	269 697	1	222 976 449 893	291 313 872	291 411
2	210 050 849 875	270 047 192	270 131	2	223 236 273 103	291 747 876	291 846
3	210 318 519 826	270 481 216	270 565	3	223 495 940 962	292 181 878	292 280
4	210 586 024 905	270 915 240	271 000	4	223 755 453 657	292 615 880	292 714
5	210 853 365 315	271 349 263	271 434	5	224 014 811 373	293 049 882	293 149
6	211 120 541 258	271 783 286	271 868	6	224 274 014 294	293 483 883	293 583
7	211 387 552 937	272 217 309	272 303	7	224 533 062 606	293 917 884	294 017
8	211 654 400 553	272 651 331	272 737	8	224 791 956 493	294 351 885	294 452
9	211 921 084 309	273 085 353	273 171	9	225 050 696 138	294 785 885	294 886
630	212 187 604 404	273 519 374	273 605	680	225 309 281 726	295 219 884	295 320
1	212 453 961 040	273 953 395	274 040	1	225 567 713 439	295 653 883	295 754
2	212 720 154 418	274 387 415	274 474	2	225 825 991 462	296 087 882	296 189
3	212 986 184 737	274 821 435	274 908	3	226 084 115 976	296 521 880	296 623
4	213 252 052 196	275 255 455	275 343	4	226 342 087 164	296 955 878	297 057
5	213 517 756 996	275 689 474	275 777	5	226 599 905 207	297 389 876	297 492
6	213 783 299 335	276 123 493	276 211	6	226 857 570 289	297 823 873	297 926
7	214 048 679 412	276 557 511	276 645	7	227 115 082 589	298 257 869	298 360
8	214 313 897 424	276 991 529	277 080	8	227 372 442 290	298 691 865	298 795
9	214 578 953 570	277 425 546	277 514	9	227 629 649 571	299 125 861	299 229
640	214 843 848 048	277 859 563	277 948	690	227 886 704 614	299 559 856	299 663
1	215 108 581 053	278 293 579	278 383	1	228 143 607 598	299 993 851	300 097
2	215 373 152 783	278 727 595	278 817	2	228 400 358 703	300 427 845	300 532
3	215 637 563 435	279 161 611	279 251	3	228 656 958 109	300 861 839	300 966
4	215 901 813 204	279 595 626	279 686	4	228 913 405 995	301 295 833	301 400
5	216 165 902 286	280 029 641	280 120	5	229 169 702 539	301 729 826	301 835
6	216 429 830 876	280 463 655	280 554	6	229 425 847 921	302 163 819	302 269
7	216 693 599 170	280 897 669	280 988	7	229 681 842 318	302 597 811	302 703
8	216 957 207 361	281 331 683	281 423	8	229 937 685 908	303 031 803	303 137
9	217 220 655 645	281 765 696	281 857	9	230 193 378 869	303 465 794	303 572

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700	230 448 921 378	303 899 785	304 006	750	243 038 048 686	325 598 777	325 721
1	230 704 313 613	304 333 775	304 440	1	243 286 146 083	326 032 746	326 155
2	230 959 555 749	304 767 765	304 875	2	243 534 101 832	326 466 714	326 589
3	231 214 647 963	305 201 755	305 309	3	243 781 916 094	326 900 682	327 024
4	231 469 590 431	305 635 744	305 743	4	244 029 589 030	327 334 650	327 458
5	231 724 383 329	306 069 733	306 178	5	244 277 120 802	327 768 617	327 892
6	231 979 026 832	306 503 721	306 612	6	244 524 511 570	328 202 583	328 327
7	232 233 521 115	306 937 709	307 046	7	244 771 761 495	328 636 550	328 761
8	232 487 866 353	307 371 696	307 480	8	245 018 870 738	329 070 515	329 195
9	232 742 062 721	307 805 683	307 915	9	245 265 839 457	329 504 481	329 629
710	232 996 110 392	308 239 670	308 349	760	245 512 667 814	329 938 446	330 064
1	233 250 009 541	308 673 656	308 783	1	245 759 355 967	330 372 410	330 498
2	233 503 760 341	309 107 642	309 218	2	246 005 904 076	330 806 374	330 932
3	233 757 362 966	309 541 627	309 652	3	246 252 312 299	331 240 338	331 367
4	234 010 817 587	309 975 612	310 086	4	246 498 580 796	331 674 301	331 801
5	234 264 124 379	310 409 596	310 520	5	246 744 709 724	332 108 263	332 235
6	234 517 283 513	310 843 580	310 955	6	246 990 699 242	332 542 226	332 669
7	234 770 295 161	311 277 564	311 389	7	247 236 549 507	332 976 188	333 104
8	235 023 159 495	311 711 547	311 823	8	247 482 260 677	333 410 149	333 538
9	235 275 876 687	312 145 530	312 258	9	247 727 832 910	333 844 110	333 972
720	235 528 446 908	312 579 512	312 692	770	247 973 266 362	334 278 071	334 407
1	235 780 870 328	313 013 494	313 126	1	248 218 561 190	334 712 031	334 841
2	236 033 147 118	313 447 475	313 561	2	248 463 717 551	335 145 990	335 275
3	236 285 277 448	313 881 456	313 995	3	248 708 735 601	335 579 950	335 710
4	236 537 261 489	314 315 436	314 429	4	248 953 615 496	336 013 908	336 144
5	236 789 099 409	314 749 416	314 863	5	249 198 357 391	336 447 867	336 578
6	237 040 791 379	315 183 396	315 298	6	249 442 961 443	336 881 825	337 012
7	237 292 337 567	315 617 375	315 732	7	249 687 427 805	337 315 782	337 447
8	237 543 738 143	316 051 354	316 166	8	249 931 756 634	337 749 739	337 881
9	237 794 993 274	316 485 332	316 601	9	250 175 948 084	338 183 696	338 315
730	238 046 103 129	316 919 310	317 035	780	250 420 002 309	338 617 652	338 750
1	238 297 067 875	317 353 288	317 469	1	250 663 919 463	339 051 608	339 184
2	238 547 887 681	317 787 265	317 903	2	250 907 699 701	339 485 563	339 618
3	238 798 562 714	318 221 241	318 338	3	251 151 343 175	339 919 518	340 052
4	239 049 093 140	318 655 218	318 772	4	251 394 850 040	340 353 473	340 487
5	239 299 479 127	319 089 193	319 206	5	251 638 220 448	340 787 427	340 921
6	239 549 720 840	319 523 169	319 641	6	251 881 454 553	341 221 380	341 355
7	239 799 818 447	319 957 143	320 075	7	252 124 552 506	341 655 334	341 790
8	240 049 772 113	320 391 118	320 509	8	252 367 514 460	342 089 286	342 224
9	240 299 582 003	320 825 092	320 944	9	252 610 340 567	342 523 239	342 658
740	240 549 248 283	321 259 065	321 378	790	252 853 030 980	342 957 190	343 093
1	240 798 771 117	321 693 039	321 812	1	253 095 585 849	343 391 142	343 527
2	241 048 150 672	322 127 011	322 246	2	253 338 005 326	343 825 093	343 961
3	241 297 387 110	322 560 983	322 681	3	253 580 289 562	344 259 043	344 395
4	241 546 480 597	322 994 955	323 115	4	253 822 438 708	344 692 994	344 830
5	241 795 431 295	323 428 927	323 549	5	254 064 452 914	345 126 943	345 264
6	242 044 239 370	323 862 898	323 984	6	254 306 332 331	345 560 893	345 698
7	242 292 904 983	324 296 868	324 418	7	254 548 077 109	345 994 841	346 133
8	242 541 428 298	324 730 838	324 852	8	254 789 687 397	346 428 790	346 567
9	242 789 809 479	325 164 808	325 286	9	255 031 163 346	346 862 738	347 001

n.	I.	II.	III.		I.	II.	III.
800	255 272 505 103	347 296 685	347 435	850	267 171 728 403	368 993 510	369 150
1	255 513 712 820	347 730 632	347 870	1	267 406 418 753	369 427 435	369 584
2	255 754 786 643	348 164 579	348 304	2	267 640 982 346	369 861 360	370 019
3	255 995 726 722	348 598 525	348 738	3	267 875 419 319	370 295 285	370 453
4	256 236 533 206	349 032 471	349 173	4	268 109 729 808	370 729 209	370 887
5	256 477 206 242	349 466 417	349 607	5	268 343 913 951	371 163 132	371 322
6	256 717 745 977	349 900 362	350 041	6	268 577 971 883	371 597 056	371 756
7	256 958 152 561	350 334 306	350 476	7	268 811 903 740	372 030 978	372 190
8	257 198 426 139	350 768 250	350 910	8	269 045 709 658	372 464 901	372 625
9	257 438 566 860	351 202 194	351 344	9	269 279 389 772	372 898 823	373 059
810	257 678 574 869	351 636 137	351 778	860	269 512 944 218	373 332 744	373 493
1	257 918 450 314	352 070 080	352 213	1	269 746 373 131	373 766 665	373 927
2	258 158 193 341	352 504 022	352 647	2	269 979 676 645	374 200 586	374 362
3	258 397 804 096	352 937 964	353 081	3	270 212 854 896	374 634 506	374 796
4	258 637 282 724	353 371 905	353 516	4	270 445 908 018	375 068 426	375 230
5	258 876 629 372	353 805 846	353 950	5	270 678 836 145	375 502 345	375 665
6	259 115 844 185	354 239 787	354 384	6	270 911 639 410	375 936 264	376 099
7	259 354 927 308	354 673 727	354 818	7	271 144 317 949	376 370 183	376 533
8	259 593 878 886	355 107 667	355 253	8	271 376 871 894	376 804 101	376 967
9	259 832 699 063	355 541 606	355 687	9	271 609 301 379	377 238 019	377 402
820	260 071 387 985	355 975 545	356 121	870	271 841 606 536	377 671 936	377 836
1	260 309 945 795	356 409 484	356 556	1	272 073 787 500	378 105 853	378 270
2	260 548 372 637	356 843 422	356 990	2	272 305 844 402	378 539 769	378 705
3	260 786 668 655	357 277 359	357 424	3	272 537 777 375	378 973 685	379 139
4	261 024 833 992	357 711 296	357 859	4	272 769 586 552	379 407 600	379 573
5	261 262 868 792	358 145 233	358 293	5	273 001 272 064	379 841 515	380 008
6	261 500 773 198	358 579 169	358 727	6	273 232 834 043	380 275 430	380 442
7	261 738 547 353	359 013 105	359 161	7	273 464 272 621	380 709 344	380 876
8	261 976 191 398	359 447 040	359 596	8	273 695 587 930	381 143 258	381 310
9	262 213 705 476	359 880 975	360 030	9	273 926 780 101	381 577 171	381 745
830	262 451 089 730	360 314 910	360 464	880	274 157 849 264	382 011 084	382 179
1	262 688 344 302	360 748 844	360 899	1	274 388 795 550	382 444 996	382 613
2	262 925 469 332	361 182 778	361 333	2	274 619 619 091	382 878 908	383 048
3	263 162 464 962	361 616 711	361 767	3	274 850 320 017	383 312 820	383 482
4	263 399 331 334	362 050 644	362 201	4	275 080 898 457	383 746 731	383 916
5	263 636 068 588	362 484 576	362 636	5	275 311 354 542	384 180 642	384 350
6	263 872 676 865	362 918 508	363 070	6	275 541 688 401	384 614 552	384 785
7	264 109 156 306	363 352 440	363 504	7	275 771 900 165	385 048 462	385 219
8	264 345 507 050	363 786 371	363 939	8	276 001 989 962	385 482 371	385 653
9	264 581 729 238	364 220 301	364 373	9	276 231 957 922	385 916 280	386 088
840	264 817 823 010	364 654 231	364 807	890	276 461 804 173	386 350 189	386 522
1	265 053 788 504	365 088 161	365 242	1	276 691 528 845	386 784 097	386 956
2	265 289 625 861	365 522 091	365 676	2	276 921 132 066	387 218 004	387 391
3	265 525 335 219	265 956 019	366 110	3	277 150 613 964	387 651 912	387 825
4	265 760 916 718	366 389 948	366 544	4	277 379 974 667	388 085 818	388 259
5	265 996 370 495	366 823 876	366 979	5	277 609 214 304	388 519 725	388 693
6	266 231 696 690	367 257 804	367 413	6	277 838 333 002	388 953 631	389 128
7	266 466 895 440	367 691 731	367 847	7	278 067 330 889	389 387 536	389 562
8	266 701 966 884	368 125 657	368 282	8	278 296 208 091	389 821 441	389 996
9	266 936 911 159	368 559 584	368 716	9	278 524 964 737	390 255 346	390 431

n.	I.	II.	III.		I.	II.	III.
900	278 753 600 953	390 689 250	390 865	950	290 034 611 363	412 383 906	412 580
1	278 982 116 865	391 123 154	391 299	1	290 257 269 395	412 817 789	413 014
2	279 210 512 601	391 557 057	391 733	2	290 479 813 331	413 251 670	413 448
3	279 438 788 287	391 990 960	392 168	3	290 702 243 288	413 685 551	413 882
4	279 666 944 048	392 424 862	392 602	4	290 924 559 383	414 119 432	414 317
5	279 894 980 012	392 858 764	393 036	5	291 146 761 732	414 553 313	414 751
6	280 122 896 302	393 292 666	393 471	6	291 368 850 452	414 987 192	415 185
7	280 350 693 046	393 726 567	393 905	7	291 590 825 658	415 421 072	415 620
8	280 578 370 368	394 160 468	394 339	8	291 812 687 467	415 854 951	416 054
9	280 805 928 394	394 594 368	394 774	9	292 034 435 995	416 288 830	416 488
910	281 033 367 248	395 028 268	395 208	960	292 256 071 356	416 722 708	416 923
1	281 260 687 055	395 462 167	395 642	1	292 477 593 668	417 156 585	417 357
2	281 487 887 940	395 896 066	396 076	2	292 699 003 044	417 590 463	417 791
3	281 714 970 027	396 329 965	396 511	3	292 920 299 600	418 024 340	418 225
4	281 941 933 441	396 763 863	396 945	4	293 141 483 451	418 458 216	418 660
5	282 168 778 305	397 197 761	397 379	5	293 362 554 711	418 892 092	419 094
6	282 395 504 743	397 631 658	397 814	6	293 583 513 496	419 325 968	419 528
7	282 622 112 878	398 065 555	398 248	7	293 804 359 919	419 759 843	419 963
8	282 848 602 835	398 499 451	398 682	8	294 025 094 095	420 193 718	420 397
9	283 074 974 735	398 933 347	399 116	9	294 245 716 138	420 627 592	420 831
920	283 301 228 704	399 367 243	399 551	970	294 466 226 162	421 061 466	421 265
1	283 527 364 862	399 801 138	399 985	1	294 686 624 279	421 495 339	421 700
2	283 753 383 333	400 235 032	400 419	2	294 906 910 605	421 929 212	422 134
3	283 979 284 238	400 668 927	400 854	3	295 127 085 252	422 363 085	422 568
4	284 205 067 702	401 102 820	401 288	4	295 347 148 334	422 796 957	423 003
5	284 430 733 845	401 536 714	401 722	5	295 567 099 962	423 230 828	423 437
6	284 656 282 789	401 970 607	402 157	6	295 786 940 252	423 664 700	423 871
7	284 881 714 655	402 404 499	402 591	7	296 006 669 314	424 098 570	424 306
8	285 107 029 567	402 838 391	403 025	8	296 226 287 261	424 532 441	424 740
9	285 332 227 644	403 272 283	403 459	9	296 445 794 206	424 966 311	425 174
930	285 557 309 008	403 706 174	403 894	980	296 665 190 262	425 400 180	425 608
1	285 782 273 779	404 140 065	404 328	1	296 884 475 539	425 834 049	426 043
2	286 007 122 079	404 573 955	404 762	2	297 103 650 149	426 267 918	426 477
3	286 231 854 029	405 007 845	405 197	3	297 322 714 205	426 701 786	426 911
4	286 456 469 747	405 441 734	405 631	4	297 541 667 818	427 135 654	427 346
5	286 680 969 355	405 875 623	406 065	5	297 760 511 099	427 569 521	427 780
6	286 905 352 972	406 309 512	406 499	6	297 979 244 159	428 003 388	428 214
7	287 129 620 719	406 743 400	406 934	7	298 197 867 110	428 437 255	428 648
8	287 353 772 715	407 177 288	407 368	8	298 416 380 061	428 871 121	429 083
9	287 577 809 079	407 611 175	407 802	9	298 634 783 124	429 304 986	429 517
940	287 801 729 930	408 045 062	408 237	990	298 853 076 410	429 738 851	429 951
1	288 025 535 388	408 478 948	408 671	1	299 071 260 027	430 172 716	430 386
2	288 249 225 572	408 912 834	409 105	2	299 289 334 088	430 606 580	430 820
3	288 472 800 600	409 346 720	409 540	3	299 507 298 700	431 040 444	431 254
4	288 696 260 590	409 780 605	409 974	4	299 725 153 976	431 474 308	431 689
5	288 919 605 662	410 214 490	410 408	5	299 942 900 023	431 908 171	432 123
6	289 142 835 932	410 648 374	410 842	6	300 160 536 951	432 342 033	432 557
7	289 365 951 520	411 082 258	411 277	7	300 378 064 871	432 775 896	432 991
8	289 588 952 543	411 516 141	411 711	8	300 595 483 890	433 209 757	433 426
9	289 811 839 118	411 950 024	412 145	9	300 812 794 118	433 643 618	433 860